

# Traulsen Refrigeration



## **SERVICE MANUAL #05**

### **Instructions For The Troubleshooting And Repair Of Traulsen R-Series Even-Thaw Refrigerator Models**

**RET232NUT-FHS & RET232NUT-HHS**

#### **-NOTICE-**

This Manual is prepared for the use of trained Authorized Traulsen Service Agents and should not be used by those not properly qualified. This manual is not intended to be all encompassing, but is written to supplement the formal training, on-the-job experience and other product knowledge acquired by Authorized Traulsen Service Agents. Before proceeding with any work, you should read, in its entirety, the repair procedure you wish to perform to determine if you have the necessary tools, instruments and skills required to perform the procedure. Procedures for which you do not have the necessary tools, instruments and skills should be performed only by a trained Authorized Traulsen Service Agent.

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For Questions Please Contact Traulsen Service At:  
**(800) 825-8220**



FORT WORTH, TX.

<b>SERIAL VOLTS</b>	<b>MODEL Hz</b>	<b>PH</b>	
<b>TOTAL CURRENT</b>	<b>AMPS</b>		
<b>MINIMUM CIRCUIT</b>	<b>AMPS</b>		
<b>MAXIMUM OVERCURRENT PROTECTION</b>			<b>AMPS</b>
<b>LIGHTS</b>	<b>WATTS</b>		
<b>HEATERS</b>	<b>AMPS</b>		
<b>REFRIGERANT DESIGN PRESSURE</b>		<b>TYPE HIGH</b>	<b>OZ LOW</b>
<b>REFRIGERANT DESIGN PRESSURE</b>		<b>TYPE HIGH</b>	<b>OZ LOW</b>

370-60294-00 REV (A)



## I. THE SERIAL TAG

The serial tag is a permanently affixed sticker on which is recorded vital electrical and refrigeration data about your Traulsen product, as well as the model and serial number. This tag is located in the upper right interior compartment on all reach-in/pass-thru and roll-in/roll-thru refrigerator, freezer and dual-temp models.

### READING THE SERIAL TAG

- Serial = The permanent ID# of your Traulsen
- Model = The model # of your Traulsen
- Volts = Voltage
- Hz = Cycle
- PH = Phase
- Total Current = Maximum amp draw
- Minimum Circuit = Minimum circuit required
- Lights = Light wattage
- Heaters = Heater amperage
- Refrigerant = Refrigerant type used
- Design Pressure = High & low side operating pressures and refrigerant charge
- Agency Labels = Designates agency listings

## II. GENERAL INFORMATION

### II. a - INTRODUCTION:

This manual applies to the following Traulsen product types:

R-Series Reach-In Even-Thaw Models

### II. b - MODEL DESIGNATIONS:

The first letter indicates the series, "R"

R = Stainless Steel Exterior & Interior

The next two letters indicate the product type

ET = Even-Thaw Refrigerator

The first number indicates the number of sections

2 = Two Section

The next two numbers indicates the product depth

32 = 32" Deep Over Body (not including hardware)

The next letter indicates the product width

N = 2 Section: 52-1/8"

If "UT" is present the product is self-contained. If "UT" is not present the product is remote.

### II. c - WIRING DIAGRAM:

Refer to the wiring diagram for any service work performed on this unit. The copy contained in this booklet is for standard 115/60/1 voltage, self-contained, incandescent light equipped models only. Other voltages and feature/options sets are not necessarily covered by the diagrams contained within. Should you require a wiring diagram for a specific unit, please contact Traulsen Service at (800) 825-8220, and provide the model and serial number of the unit involved.

### II. d - INSTALLATION:

Generally R-Series refrigeration products are installed by the dealer or others contracted by the dealer or owner. Detailed installation instructions are included with each unit.

### II. e - CLEANING:

Detailed cleaning instructions are included with each unit, however special care **MUST** be given to the condenser coil. The condenser coil must be cleaned at a minimum of every six months. Your particular application may require more frequent intervals. This can be done with a vacuum cleaners using a brush attachment, or a stiff brush or wisk broom. For more information please refer to the Owner's Manual supplied with the unit.

Your Traulsen unit may incorporate a washable, reusable wire mesh filter on the condensing unit. Clean it with soap and water or in a dishwasher.

### II. f - TOOL REQUIREMENTS:

For most jobs a standard set of hand tools, a VOM and AC current tester, along with a temperature tester or thermometer are adequate. However in some cases the following additional tools may be required as well:

- Refrigeration Gauge Manifold
- Refrigeration Reclaiming Equipment
- Acetylene Torch
- Anti-Static Grounding Kit (TL 84919)
- Nitrogen Bottle With Gauges
- Thin 5/16" Open End Wrench
- Refrigerant Reclaim Unit

### II. g - REF'N SYSTEM - THEORY OF OPERATION:

The refrigeration system is the mechanism whereby heat is transferred from the cabinet to the outside air. It works under the principle that the heat moves from hot to cold as it tries to establish equilibrium.

The temperature control control signals a need for heat to be removed from the cabinet. The compressor begins by compressing the refrigerant gas as it is discharged. The high pressure refrigerant now circulates through the condenser, removing heat from the refrigerant and condensing it into a liquid. From there the refrigerant flows to the filter drier which removes all traces of moisture and particles from the system.

After the filter drier, the refrigerant passes through a "metering device." Traulsen uses a thermostatic expansion valve to regulate the flow of refrigerant into the evaporator coil.

In the evaporator coil, heat is transferred from the cabinet to the refrigerant, which changes from a cold liquid to a warm low pressure gas. When the desired cabinet air temperature has been reached, the temperature control shuts off the compressor.

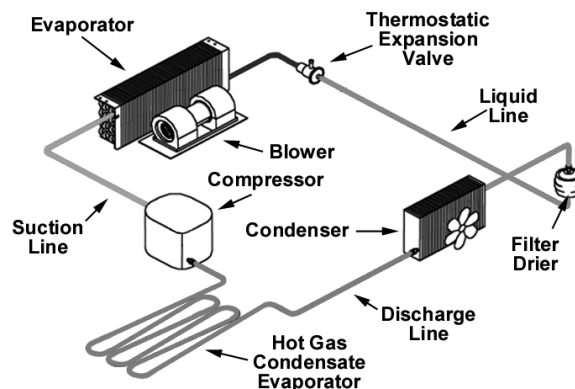


Fig. 1 - The Traulsen Refrigeration System

## II. GENERAL INFORMATION (cont'd)

### II. h - AIR FLOW REQUIREMENTS:

In order to assure optimum performance, the condensing unit of your Traulsen unit **MUST** have an adequate supply of air for cooling purposes. Therefore, the operating location must either have a minimum of 12" clearance overhead of the condensing unit or allow for unrestricted air flow at the back of the unit. The louver panel must remain free and clear of obstruction. The condenser coil must be kept clean (see II. e).

Please note that clearance of at least 12" above is required in order to perform certain maintenance tasks.

### II. i - CONTROL LOCATION:

On all Even-Thaw refrigerator models, the temperature control is located on the evaporator housing behind the louvers.

### II. j - SPECIFICATIONS:

R-Series Even-Thaw Refrigerator	
	ET232N
Horsepower	1/2 HP
Condensing Unit - BTU/HR	4750
Condensing Unit Amp Draw	10.0
Fan, Lights, Etc. Amp Draw	5.0
Refrigerant	R-404A
Refrigerant Charge (oz.)	20

### II. k - OPERATING DATA CHART:

Even-Thaw Models (Cabinet Temperature Set at 38°F)

AMBIENT	<u>70°F</u>	<u>100°F</u>
SUCTION PRESSURE	45 PSIG	50 PSIG
SUCTION TEMPERATURE	11°F	15°F
DISCHARGE PRESSURE	240 PSIG	360 PSIG
DISCHARGE TEMPERATURE	100°F	130°F

## III. REMOVAL & REPLACEMENT OF BASIC PARTS

**WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.**

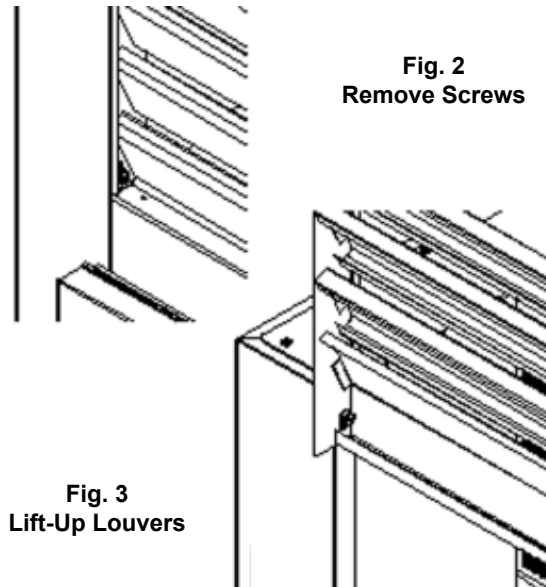
### III. a - STANDARD INCANDESCENT LIGHTS:

Lights are usually located in the front center of the unit, mounted on the interior top. To replace the light bulb, first remove the light cover by squeezing the sides together, which releases the tabs from the holding slots. Replace the burned out light bulb with a similar type appliance bulb.

To replace the light cover, squeeze the sides together and reinsert tabs in to the holding slots and release to lock in place.

### III. b - LOUVER ASSEMBLY:

To remove the louver assembly, first remove the two screws located on both sides at the bottom of the louver assembly (see figure 2). Once the screws are removed, the panel can be pivoted upwards allowing full access to the front facing condenser (see figure 3).



When finished, lower the louver assembly and replace the screws to hold it in place.

### III. REMOVAL & REPLACEMENT OF BASIC PARTS (cont'd)

**WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT/TAGOUT PROCEDURES.**

#### III. c - EVAPORATOR HOUSING COVER:

Remove the screws on top of the evaporator housing. Lift-off the housing cover to complete removal (see figure 4).

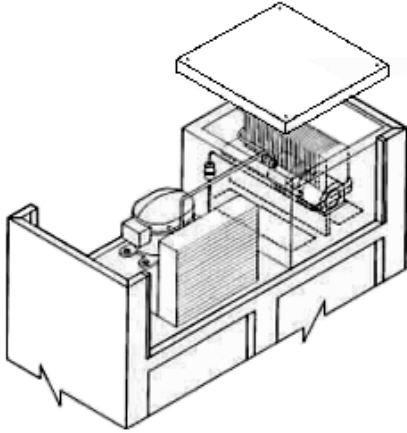


Fig. 4  
Lift-Off Cover

Reverse the procedure when done to reinstall, making sure that the gasket forms a tight seal.

#### III. d - REMOVING THE DOOR:

The door can be easily removed from the cabinet. To remove the door, remove the plug at the bottom of the top hinge. Inside the hinge there is a small screw which secures the door in place. Remove this with a flat head screwdriver and the door can then be lifted off the hinge (see figure 5).

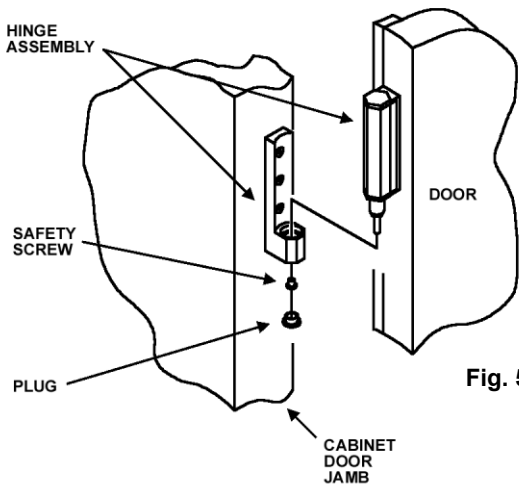


Fig. 5

#### III. e - DOOR HINGE:

The hinge can be easily removed from the cabinet. To remove the door, follow the instructions listed in section "III. d."

To remove the door portion of the hinge from the door, lift off the hinge cover and then remove the three Phillips head screws which secure the hinge in place on the door (see figure 6). To remove the cabinet portion of the hinge, remove the three Phillips head screws which hold it in place. On solid door units, the top hinge(s) contains a microswitch for controlling the interior lighting.

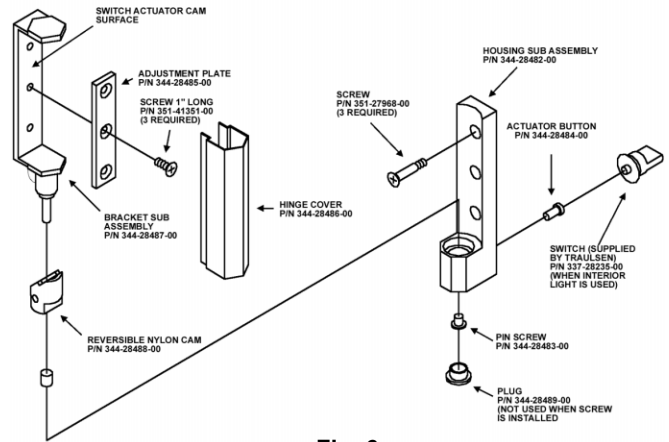


Fig. 6

To reassemble the hinge reverse the previous procedure.

### III. REMOVAL & REPLACEMENT OF BASIC PARTS (cont'd)

**WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT/TAGOUT PROCEDURES.**

#### III. f - DOOR GASKETS:

To remove the gasket to be replaced, grasp it firmly by one corner and pull it out. Before attempting to install a new gasket, both the unit and the gasket itself must be at room temperature. Insert the four corners first by using a rubber mallet (or hammer with a block of wood). After the corners are properly inserted, work your way towards the center from both ends by gently hitting with a mallet until the gasket is completely seated in place (see figure 7 for proper gasket placement).

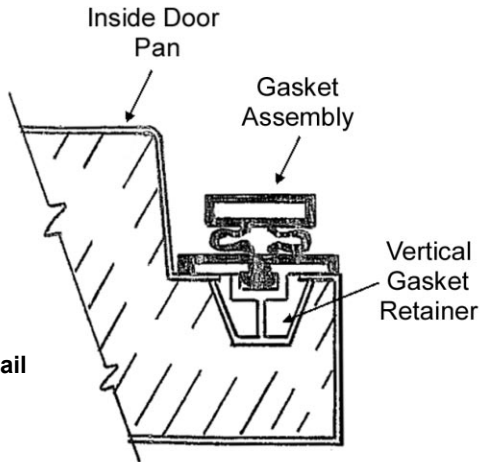


Fig. 7  
Gasket Detail

**NOTE:** The gasket may appear too large, but if it is installed as indicated above it will slip into place.

#### III. g - DRAIN PAN:

To remove the drain pan, begin by removing the evaporator housing cover as outlined in section "III. c." Next, remove the screws and brackets which secure the drain pan, and remove the drain tube from the drain pan. Finish by sliding the drain pan out from under the coil.

Reverse the procedure to install.

#### III. h - DOOR BREAKER STRIPS:

The door breaker strips can be removed to provide access to the door perimeter heaters. All cabinet heater wires are face mounted as shown in figure 8. Face mounted heater wires are located inside the foam. Replacement of heater wires can be performed by following procedure "IV. g - REPLACING THE ANTI-CONDENSATE DOOR PERIMETER HEATERS."

To remove the four breaker strips from around a door frame, unscrew the sheet metal screws along the front and back of each.

After removing all the screws, the breaker strip will still be firmly mounted to the cabinet foam insulation. Gently lift the breaker strip away from the cabinet to remove.

Reverse the procedure to re-install breaker strips.

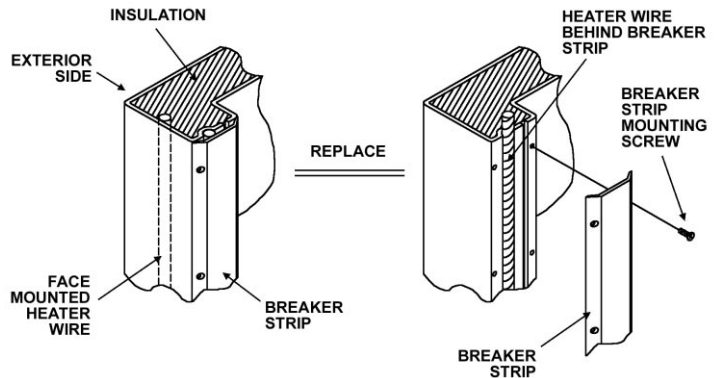


Fig. 8  
Heater/ Breaker Cap Detail

## **IV. a - REPLACING THE CONDENSER FAN MOTOR AND/OR BLADE**

### **WARNINGS:**

1) DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT/TAGOUT PROCEDURES.

STEP 1: Remove the louver assembly completely.

STEP 2: Remove the screws holding the fan motor bracket to the compressor mounting base.

STEP 3: Remove the blade from the motor shaft by removing the nut.

NOTE: Install the concave side of the fan blade toward the motor.

NOTE: If the blade is all that is being replaced, stop here and reverse procedure to install.

STEP 4: Remove the mounting bracket from the motor

STEP 5: Disconnect the lead wires at the compressor junction box.

STEP 6: Reverse the procedure to install.

## **IV. b - REPLACING THE CONDENSER COIL**

### **WARNINGS:**

1) DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT/TAGOUT PROCEDURES.

2) THIS PROCEDURE REQUIRES THE USE OF REFRIGERANTS. BE CERTAIN THE WORK AREA IS WELL VENTILATED. SAFETY GOGGLES AND GLOVES SHALL BE WORN SINCE REFRIGERANTS MAY CAUSE BURNS TO THE SKIN.

STEP 1: Remove the louver assembly completely.

STEP 2: Recover the refrigerant in the system following the current EPA Guidelines for refrigerant recovery.

NOTE: The use of reclaiming equipment is required.

STEP 3: Disconnect the input and output lines to the condenser coil at the soldered joints closest to the condenser.

STEP 4: Remove the four (4) screws which secure the condenser coil to the condensing unit base and remove the coil from the cabinet.

STEP 5: Remove the shroud from the coil for installation to the new coil.

STEP 6: Reverse the procedure to install the new fan motor.

STEP 7: Install a new drier.

STEP 8: Charge the refrigeration system as outlined under "CHARGING SYSTEM" in "SERVICE PROCEDUES AND ADJUSTMENTS."

STEP 9: Reconnect power to the unit.

## IV. c - REPLACING THE COMPRESSOR

### **WARNINGS:**

1) DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT/TAGOUT PROCEDURES.

2) THIS PROCEDURE REQUIRES THE USE OF REFRIGERANTS. BE CERTAIN THE WORK AREA IS WELL VENTILATED. SAFETY GOGGLES AND GLOVES SHALL BE WORN SINCE REFRIGERANTS MAY CAUSE BURNS TO THE SKIN.

STEP 1: Recover the refrigerant in the system following the current EPA Guidelines for refrigerant recovery.

NOTE: The use of reclaiming equipment is required.

STEP 2: Remove the compressor junction box cover.

STEP 3: Disconnect all wire leads coming into the junction box.

STEP 4: Disconnect the input and output lines to the compressor.

STEP 5: Remove the compressor which is secured by four (4) nuts.

STEP 6: Install the new compressor and connect the input and output lines.

STEP 7: Connect the lead wires at the junction box.

STEP 8: Install a new drier.

STEP 9: Charge the refrigeration system as outlined under "CHARGING SYSTEM" in "SERVICE PROCEDUES AND ADJUSTMENTS."

STEP 10: Reconnect power to the unit.

## IV. d - REPLACING THE DOOR PERIMETER HEATERS

### **WARNINGS:**

1) DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT/TAGOUT PROCEDURES.

STEP 1: Remove the four stainless steel breaker strips around the door perimeter by removing the screws which secure each to the cabine.

STEP 2: Disconnect lead wires and ground to heater from the unit.

STEP 3: On the replacement heater, remove the paper backing and install in door frame behind front flange screw holes.

STEP 4: Take care not to pinch the heater wires at the corners of the door frame channel.

STEP 5: Connect the lead wires and attach the ground wire.

STEP 6: Replace and secure the four stainless steel breaker strips to the door frame. Be careful not to force the breaker caps into the corners.



## V. SERVICE PROCEDURES & ADJUSTMENTS

**WARNING: CERTAIN PROCEDURES IN THIS SECTION REQUIRE ELECTRICAL TEST OR MEASUREMENTS WHILE POWER IS APPLIED TO THE MACHINE. EXERCISE EXTREME CAUTION AT ALL TIMES. IF TEST POINTS ARE NOT EASILY ACCESSIBLE, DISCONNECT POWER, ATTACH TEST EQUIPMENT AND REAPPLY POWER TO TEST.**

### V. a - SYSTEM ACCESS:

All external indicators should be checked as part of system diagnosis before determining the refrigerant pressures. Improper access may expose the refrigerant to contaminants and non-condensables which will result in system failure.

### V. b - SWEAT-ON PIERCING VALVES:

**NOTE:** Sweat-on piercing valves are used for system diagnostics, but may be left on after service is complete. They may be installed while the system is fully charged.

- 1) Place one piercing valve on the compressor process tube and one on the liquid line drier process tube. Follow the installation instructions provided by the manufacturer of the piercing valve.
- 2) When complete, follow the guidelines as outlined under "LEAK CHECK" and "EVACUATING SYSTEM."

### V. c - REFRIGERANT LEAK CHECK:

**DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.**

**THIS PROCEDURE REQUIRES THE USE OF REFRIGERANTS. BE CERTAIN THE WORK AREA IS WELL VENTILATED. SAFETY GOGGLES AND GLOVES SHALL BE WORN SINCE REFRIGERANTS MAY CAUSE BURNS TO THE SKIN.**

**NOTE:** The use of R-22 in small quantities is recommended as a trace gas for leak detection.

**NOTE:** This leak check procedure is to be used only after the refrigerant has been properly reclaimed.

- 1) Access the refrigeration system (note: see section "V. a - SYSTEM ACCESS").
- 2) Attach gauge manifold set to the system, low side to process tube on the compressor and the high side to the process tube on the drier.
- 3) Connect refrigerant bottle to the center of gauge manifold and open the valve on the bottle. Bleed charging hose at the manifold gauge to remove air from the system.
- 4) Open valve on low side of gauge manifold and charge system with one ounce of R-22.
- 5) Close low side valve on gauge manifold and the valve on the refrigerant bottle.
- 6) Disconnect refrigerant bottle and connect nitrogen bottle.

### V. c - REFRIGERANT LEAK CHECK (cont'd):

**NOTE:** The use of a nitrogen regulator is required.

- 7) Set output valve on nitrogen valve to 120 psi.
- 8) Open nitrogen bottle valve and low side gauge manifold valve. Allow pressure to equalize.
- 9) Shut off both valves and disconnect nitrogen bottle.
- 10) Use a leak detector or a thick soapy solution and check for leaks at all tubing connections.

**A - If leaks are found, repair leaks and repeat process.**

**B - If no leaks are found, evacuate system as outlined in section "V. d - EVACUATING SYSTEM").**

- 11) Charge the system and check for proper operation.

### V. d - EVACUATING SYSTEM:

**Introduction - Refrigeration reclaiming equipment is required. Our goal in system evacuation is to remove all the non-condensables possible. No evacuation method will remove 100% of the moisture and air from within the refrigeration circuit. Because of this, guidelines and methods must be developed and adhered to ensuring only harmless amounts of contaminants remain in the system.**

#### GUIDELINES

**WARNING - DO NOT PRESSURIZE SYSTEM ABOVE 150 PSIG. PRIOR TO EVACUATION OR DURING LEAK TEST PROCEDURES.**

- Use only a two stage vacuum pump (2 CFM or greater) and electronic micron gauge.
- Evacuate from high and low sides of the system.
- No chemical additive or alcohols are to be used to "dry up" a system.
- Blow down of system with DRY NITROGEN prior to evacuation is acceptable and many times desirable. See "System Clean-Up."
- Evacuate to 200 microns.

## VI. SERVICE PROCEDURES & ADJUSTMENTS (cont'd)

**WARNING: CERTAIN PROCEDURES IN THIS SECTION REQUIRE ELECTRICAL TEST OR MEASUREMENTS WHILE POWER IS APPLIED TO THE MACHINE. EXERCISE EXTREME CAUTION AT ALL TIMES. IF TEST POINTS ARE NOT EASILY ACCESSIBLE, DISCONNECT POWER, ATTACH TEST EQUIPMENT AND REAPPLY POWER TO TEST.**

### V. d - EVACUATING SYSTEM/GUIDELINES (cont'd):

#### PROCEDURE

**WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.**

**WARNING: THIS PROCEDURE REQUIRES THE USE OF REFRIGERANTS. BE CERTAIN THE WORK AREA IS WELL VENTILATED. SAFETY GOGGLES AND GLOVES SHALL BE WORN SINCE REFRIGERANTS MAY CAUSE BURNS TO THE SKIN.**

- 1) Access the refrigeration system as outlined under "SYSTEM ACCESS."
- 2) Connect low (blue) side of gauge manifold to schrader valve on compressor process line and high (red) side of gauge manifold to schrader valve on filter/drier process line.
- 3) Connect center line of gauge manifold to vacuum pump.
- 4) Turn vacuum pump on and open both sides of gauge manifold.
- 5) Pull a vacuum to 200 microns.
- 6) Break the vacuum with 3 psig of dry nitrogen.
- 7) Repeat steps 5 and 6.
- 8) Pull vacuum to 200 microns.
- 9) Charge system and check for proper operation.

### V. e - CHARGING SYSTEM:

**WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.**

**WARNING: THIS PROCEDURE REQUIRES THE USE OF REFRIGERANTS. BE CERTAIN THE WORK AREA IS WELL VENTILATED. SAFETY GOGGLES AND GLOVES SHALL BE WORN SINCE REFRIGERANTS MAY CAUSE BURNS TO THE SKIN.**

- 1) Access the refrigeration system.
- 2) Attach gauge manifold set to system, low side to process tube on the compressor and the high side to the process tube on the drier.

**NOTE: See "SYSTEM ACCESS."**

### V. e - CHARGING SYSTEM (cont'd):

- 3) Be sure the system is properly leak checked and evacuated before charging as outlined under "LEAK CHECK" and "EVACUATING SYSTEM."
- 4) Make certain both valves are closed on the gauge manifold. Open the valve on the bottle. Bleed charging hose at the manifold gauge to remove air.

**NOTE: Initially charge system through high side to prevent liquid refrigerant from reaching compressor.**

- 5) Open the high side gauge valve (red). Allow refrigerant to flow into the system until the nameplate charge is reached or until the high side will not accept any more refrigerant. At this point, shut the gauge and bottle valves.
- 6) Reconnect power to the unit and check for proper operation and high pressure leaks.
- 7) Add the remaining amount of refrigeration charge through the low side with the compressor running.
- 8) Check for proper operation and leaks.
- 9) Disconnect power to the unit and replace any covers removed.

### V. f - SYSTEM CLEAN UP/INTRODUCTION:

When a compressor burn-out or moisture infiltration is encountered, the service person must make the determination as to the degree of system contamination. Normally a compressor burn-out will fit into one of three categories:

- **CONTAINED** - compressor oil not acidic, no oil discoloration.
- **CONTAMINATED COMPRESSOR** - oil acidic, discoloration of oil, contamination limited to compressor.
- **MASSIVE CONTAMINATION** - contaminated oil and/or refrigerant pumped through system.

#### CONTAINED

- 1) Replacement of liquid line drier.
- 2) Install suction filter drier for clean up and then remove it when service is complete. Usually within 48 hours.
- 3) Replacement of compressor.
- 4) Evacuation (to 200 microns).
- 5) Charge by weight.

#### CONTAMINATED COMPRESSOR

The "contaminated compressor" requires the same procedure as the "contained" burn-out. Plus, the system must be flushed with nitrogen after the compressor and drier has been removed.

## V. SERVICE PROCEDURES & ADJUSTMENTS (cont'd)

**WARNING: CERTAIN PROCEDURES IN THIS SECTION REQUIRE ELECTRICAL TEST OR MEASUREMENTS WHILE POWER IS APPLIED TO THE MACHINE. EXERCISE EXTREME CAUTION AT ALL TIMES. IF TEST POINTS ARE NOT EASILY ACCESSIBLE, DISCONNECT POWER, ATTACH TEST EQUIPMENT AND REAPPLY POWER TO TEST.**

### V. f - SYSTEM CLEAN UP/INTRODUCTION (cont'd):

#### MASSIVE CONTAMINATION

The replacement compressor **MUST NOT** be installed until after system clean-up procedures have been completed.

- 1) Remove the burned-out compressor as outlined under "COMPRESSOR" in "Section IV. f".
- 2) Remove the TXV metering device.
- 3) Purge nitrogen through the high and low sides of system until moisture and contaminated oil has been removed from the remaining components of the system.
- 4) Reassemble refrigeration system and add an CW style liquid drier and a suction line drier.
- 5) Purge nitrogen through the high and low sides of system for 5 minutes.
- 6) Evacuate refrigeration as outlined under "EVACUATING SYSTEM" for 30 minutes. Repeat nitrogen purge and evacuation two more times.
- 7) Charge system as outlined under "CHARGING SYSTEM". Allow for the increased liquid capacity of the liquid line drier.
- 8) Reconnect power and check for proper operation.
- 9) Disconnect power and install any panels removed.
- 10) Return between 24 and 48 hours to recover gas, replace liquid line drier with a CW style drier. Remove the suction drier, but do not replace.
- 11) Evacuate and charge system as outlined under "EVACUATING SYSTEM" and "CHARGING SYSTEM .

### V. h - HEATER TEST - DOOR PERIMETER HEATER:

- 1) Access the heater wire around the door frame.
- 2) Plug the unit in and verify 120 volt supply to the heater.
- 3) The reading should be .25 amp.

### V. i - HEATER TEST - DEFROST HEATER:

**WARNING: UNPLUG UNIT BEFORE SERVICING.**

- 1) Access the heater lead wire to the defrost heater.
- 2) Plug the unit in, turn the defrost timer to start a defrost cycle.
- 3) Verify 120 volt supply to the heater.
- 4) The reading should be 3.7 amp.
- 5) If you want to perform a continuity check:
  - a. Unplug the unit.
  - b. Disconnect the lead wires to the heater.
  - c. Use an ohmmeter to check for 32.4 ohms.

## VI. ELECTRICAL OPERATION

### VI. a - NORMAL OPERATION:

1. Conditions
  - a) Unit connected to correct voltage.
  - b) Defrost settings correct.
  - c) Condensing unit controlled by temperature control.
  - d) Cabinet at desired temperature.
  - e) Door perimeter heaters are powered.
  - f) Evaporator fan powered.
  - g) Temperature control operating correctly.
2. Cabinet temperature rises above set temperature.
  - a) Temperature control initiates compressor operation.
  - b) Evaporator fan should be ON.
3. Set temperature is met.
  - a) Conditions return to those outlined in step 1.

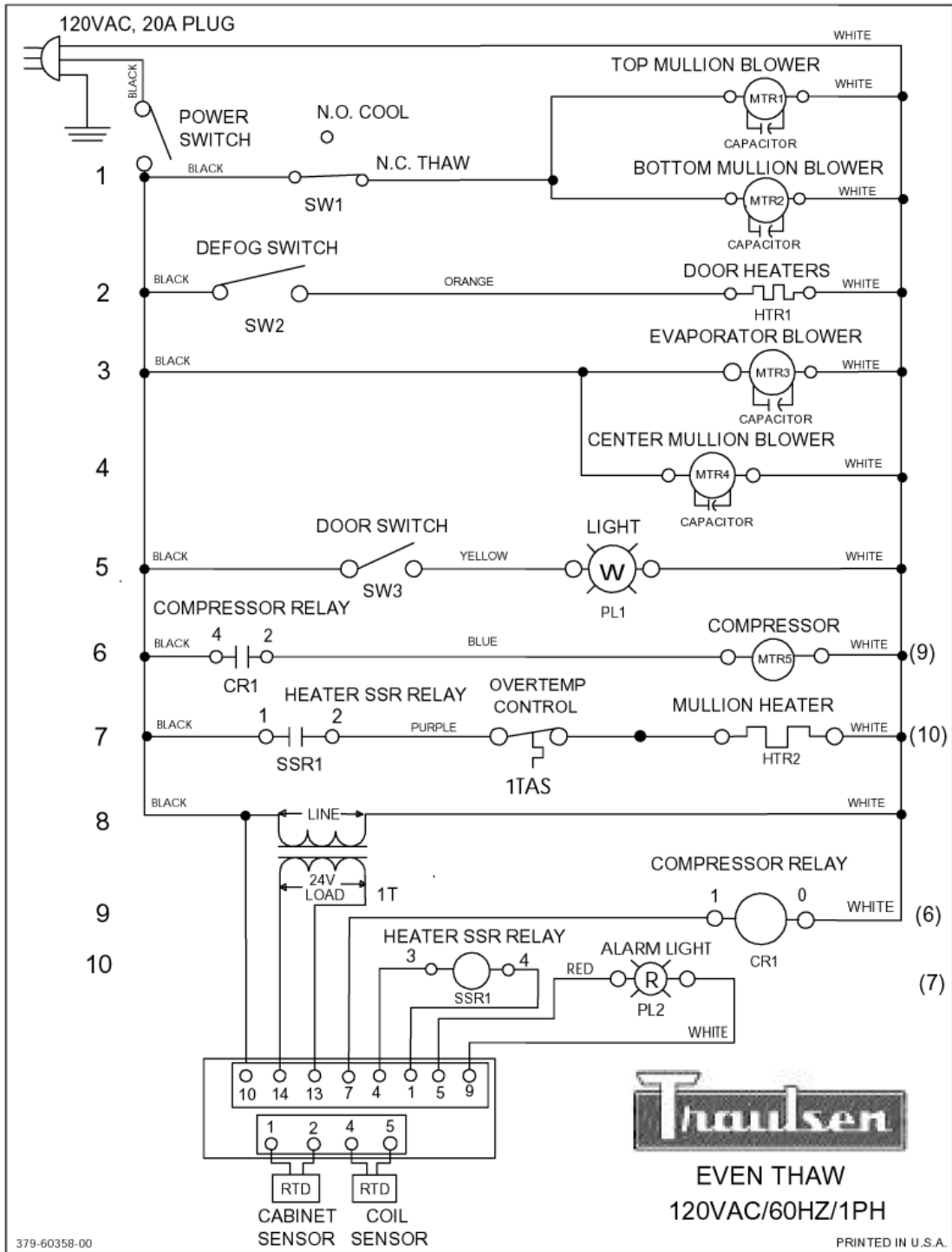
### VI. b - DEFROST MODE:

1. Conditions
  - a) Unit operating in normal mode.
2. Defrost initiated by temperature control.
  - a) Control turns OFF the evaporator fan.
3. Defrost terminated by either: 1) Maximum Set Time Interval, or 2) Evaporator Coil Temperature.
  - a) Defrost heater turns OFF.
  - b) Drain pan heater turns OFF (if so equipped).
4. Cabinet returns to normal operation.
  - a) Temperature controlled by controller.
  - b) Evaporator fan stays OFF until evaporator coil reaches desired temperature.

### VI. c - COMPONENT FUNCTION:

<b>Compressor:</b>	Pumps refrigerant thru refrigeration system components and compresses the low pressure vapor to high pressure vapor.
<b>Condenser Fan:</b>	Draws air across condenser coil to aid in removing heat from the refrigerant and moves air across compressor to aid in cooling the compressor.
<b>Evaporator Blower:</b>	Draws air from the cabinet and pulls the air thru the evaporator coil.
<b>Defrost Heater:</b>	Defrosts evaporator coil; operates only during defrost cycle.
<b>Start Capacitor:</b>	Stores electrical charge which helps start the compressor motor.
<b>Run Capacitor:</b>	Helps keep the compressor motor running after starting.
<b>Door Switch:</b>	A concealed switch which operates the interior incandescent lights.
<b>Contactors:</b>	Controls voltage to compressor motors.
<b>Temperature Controller:</b>	Electronic control which regulates the interior temperature of the cabinet, and powers ON and OFF the auxiliary fans and heaters needed for even-thaw operation.
<b>Door Perimeter Heater:</b>	Heats door opening to prevent condensate from forming.

# VII. WIRING DIAGRAM



## VIII. PARTS LISTING

**NOTE: Part numbers listed are for standard products as currently manufactured. For products manufactured as other than standard, or for older production units, please contact the factory.**

<b>PART NO.</b>	<b><u>NAME OF PART</u></b>
<b>HALF LENGTH REACH-IN DOORS</b>	
200-60136-00	2-Section "N-Width" Models - Hinged Right
200-60136-01	2-Section "N-Width" Models - Hinged Left
<b>FULL LENGTH REACH-IN DOORS</b>	
200-60135-00	2-Section "N-Width" Models - Hinged Right
200-60135-00	2-Section "N-Width" Models - Hinged Left
<b>DOOR GASKETS</b>	
341-60060-00	Gasket-Half Length 2-Section "N-Width" Models
341-60259-00	Gasket-Full Length 2-Section "N-Width" Models
<b>DOOR LOCKS</b>	
346-28924-42	Lock Keys T-42
346-13186-42	Lock Cylinder
346-13189-00	Lock Bolt
SER-60443-00	Lock Keeper Reach-In
SER-60434-00	Lock Keeper Roll-in
<b>OTHER</b>	
378-60013-00	Alarm Indicator Light
337-60006-00	Start Capacitor
337-60032-00	Terminal Block
337-31075-02	Thermal Fuse
329-60048-00	Mullion Heater
333-60051-00	Blower Harness
601-60809-00	Panel Air Duct
601-60811-00	Cover Air Duct
601-60814-00	Channel Heaters
344-60126-00	Thermometer
337-60311-00	Heater Relay
337-60324-00	2-Pole Relay, 30 Amp
337-60309-00	Transformer
337-60308-00	Temperature Sensor
<b>TRAY SLIDES</b>	
701-60032-00	No. 1 Type Tray Slide
<b>LOUVER ASSEMBLY</b>	
500-60138-06	2-Section "N" Reach-In Models
351-15822-02	Louver Screws For All Above
<b>CABINET SUPPORTS</b>	
344-13168-01	6" High Adjustable Stainless Steel Leg
344-13140-01	6" High Locking Caster
351-15822-02	Caster Bolts For Above
<b>HINGES</b>	
SER-28583-00	Door Hinge
344-28484-00	Actuator
<b>TEMPERATURE CONTROL</b>	
324-60027-00	Even-Thaw Control
<b>LIGHTS</b>	
333-60241-00	Lamp Holder 56" LG
337-30858-00	Light Cover, Flush Mounted
378-29776-00	Incandescent Light Bulb

## IX. TROUBLESHOOTING

**WARNING:** CERTAIN PROCEDURES IN THIS SECTION REQUIRE ELECTRICAL AND REFRIGERATION SYSTEM TEST OR MEASUREMENTS WHILE POWER IS APPLIED TO THE MACHINE. EXERCISE EXTREME CAUTION AT ALL TIMES. IF TEST POINTS ARE NOT EASILY ACCESSIBLE, DISCONNECT POWER, ATTACH TEST EQUIPMENT AND REAPPLY POWER TO TEST.

Compressor will not run, compressor has no current draw.	<ol style="list-style-type: none"> <li>1. Main circuit breaker open.</li> <li>2. Compressor overload tripped.</li> <li>3. Cabinet temperature satisfied.</li> <li>4. Wired wrong or faulty connection.</li> <li>5. Temperature control malfunction<sup>1</sup>.</li> <li>6. Start component malfunction.</li> <li>7. Compressor motor windings open.</li> </ol>
Compressor will not run, current draw and trips overload.	<ol style="list-style-type: none"> <li>1. Low voltage.</li> <li>2. Start component malfunction.</li> <li>3. Compressor windings shorted.</li> <li>4. Locked rotor.</li> <li>5. Excessive discharge pressure.</li> </ol>
Compressor short cycles on overload.	<ol style="list-style-type: none"> <li>1. Low voltage.</li> <li>2. Low refrigerant charge.</li> <li>3. Dirty condenser coil.</li> <li>4. Wired wrong or faulty connection.</li> <li>5. Condenser fan inoperative.</li> <li>6. Run capacitor malfunction.</li> <li>7. Start component malfunction.</li> <li>8. Temperature control malfunction<sup>1</sup>.</li> <li>9. High head pressure.</li> </ol>
Compressor short cycles.	<ol style="list-style-type: none"> <li>1. Improper air flow over evaporator coil.</li> <li>2. Low ambient conditions.</li> <li>3. Temperature control malfunction<sup>1</sup>.</li> <li>4. Bad sensors.</li> <li>5. Temp differential set too close.</li> </ol>
Continuous unit operation.	<ol style="list-style-type: none"> <li>1. Loss of refrigerant.</li> <li>2. Excessive door openings.</li> <li>3. Temperature control malfunction<sup>1</sup>.</li> <li>4. Broken compressor valves.</li> <li>5. Very dirty condenser.</li> </ol>
Compressor run time lengthy.	<ol style="list-style-type: none"> <li>1. Partial loss of refrigerant.</li> <li>2. High ambient conditions.</li> <li>3. Dirty condenser coil or improper air flow over condenser coil.</li> <li>4. Excessive product load.</li> <li>5. Excessive door openings.</li> <li>6. Door gasket requires replacement.</li> <li>7. Temperature control malfunction<sup>1</sup>.</li> <li>8. Contaminates in refrigeration system.</li> <li>9. Compressor valve leakage.</li> <li>10. Inadequate defrost cycle.</li> </ol>
Low suction pressure.	<ol style="list-style-type: none"> <li>1. Expansion valve restricted.</li> <li>2. Drier plugged.</li> <li>3. Loss of refrigerant.</li> <li>4. Poor air flow.</li> <li>5. Iced evaporator coil.</li> </ol>
High head pressure.	<ol style="list-style-type: none"> <li>1. Improper air flow across condenser.</li> <li>2. High ambient conditions.</li> <li>3. Overcharge of refrigerant.</li> <li>4. Air in system.</li> <li>5. Dirty condenser coil.</li> </ol>
Coil icing.	<ol style="list-style-type: none"> <li>1. Number of defrost cycles too few.</li> <li>2. Defrost duration too short.</li> <li>3. Cabinet air leak.</li> <li>4. Drain tube plugged.</li> <li>5. Defrost heater not working.</li> <li>6. Non-frozen product put into cabinet.</li> <li>7. Coil sensor failure.</li> </ol>
Sensor Light Illuminated	<ol style="list-style-type: none"> <li>1. Slow or inadequate thawing - Check position of Cool/Thaw switch.</li> </ol>
Moisture Condensing Around Door Perimeter	<ol style="list-style-type: none"> <li>1. Excessively humid environment - Turn on Door perimeter heaters using defogger switch.</li> </ol>